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# DESCRIPTION OF INVENTION
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## GLASS

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The invention relates to compositions of tungsten and molybdenum glasses, which are used, for example, in the manufacture of parts of three-phase metal halide lamps, the

envelopes of which must have elevated for thermal stability and softening point.

This glass can be used in electric, radio and lighting technology.

There are known refractory glasses of the aluminosilicate system for joining to tungsten and molybdenum having the following composition, wt%:

| | |
|---|---|
| $SiO_2$ | 54-65 |
| $Al_2O_3$ | 15-22 |
| CaO and MgO together | 7-30 |
| PbO | 10 [1] |

Closest in technical essence and end result to the described glass is a glass of the following composition, wt%:

| | |
|---|---|
| $SiO_2$ | 55-70 |
| $B_2O_3$ | 0-10 |
| $Al_2O_3$ | 13-25 |
| RO | 10-25 |

where RO is at least one oxide from the group MgO, CaO, SrO, BaO [2].

Shortcomings of these glasses are insufficient thermal stability and darkening along with solarization of the glasses during use.

The goal of the invention is an improvement of thermal stability and prevention of solarization of the glass.

To achieve this goal, the known glass, which contains $SiO_2$, $B_2O_3$, $Al_2O_3$, CaO, MgO and BaO, additionally contains at least one oxide from the group $As_2O_3$, $Sb_2O_3$, $SO_3$, $SnO_2$ and $CeO_2$ in the following ratio of components, wt%:

| | |
|---|---|
| $SiO_2$ | 55-65 |
| $B_2O_3$ | 5-18 |
| $Al_2O_3$ | 10-19 |
| CaO | 1-8 |
| MgO | 0.5-4 |
| BaO | 7-15 |
| at least one oxide from the group $As_2O_3$, $Sn_2O_3$, $SO_3$, $SnO_2$ and $CeO_2$, | 0.1-1.5 |

Table 1 gives specific examples of glass compositions.

The physicochemical properties of the glassese are given in Table 2.

A batch of the above composition is weighed out in the following order: sand, barite, magnesium carbonate, chalk, boric acid, alumina, barium carbonate, antimony trioxide.

The mixture is mixed in a rotary mixer for 5 minutes and tested for uniformity with respect to boric anhydride.

Cooking of the glass is done in a gas furnace with a capacity of 1.8 t at 1570-1590°C.

Items were made in the form of bead molds and tubes of various kinds as well as cylinders 110-120 mm in diameter and up to 750 mm long.

The glasses have improved thermal stability, do not change light transmission in use, and also have improved technological properties: the tendency toward crystallization is reduced, which assures vacuum-tight joints with tungsten or molybdenum.

This set of properties assures the production of articles, in particular cylinders for gas discharge lamps, that withstand

elevated thermal loads (cylinder temperature to 600°C) and sharp changes of temperature (when heating is switched off and under the effect of atmospheric precipitation).

Table 1.

| Окислы | Состав стекла, вес.% | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| $SiO_2$ | 55,0 | 56,50 | 55,0 | 64,5 |
| $B_2O_3$ | 17,5 | 9,50 | 10,0 | 5,0 |
| $Al_2O_3$ | 17,0 | 17,00 | 17,5 | 10,0 |
| CaO | 2,0 | 5,00 | 5,0 | 4,5 |
| MgO | 1,0 | 2,50 | 2,5 | 0,5 |
| BaO | 7,0 | 8,50 | 8,5 | 15,0 |
| $SnO_2$ | 0,5 | - | 0,5 | - |
| $CeO_2$ | - | - | 0,5 | 0,5 |
| $As_2O_3$ | - | 0,35 | - | - |
| $SO_3$ | - | 0,65 | - | - |
| $Sb_2O_3$ | - | - | 0,5 | - |

Key: 1 Oxides
2 Composition of glass, wt%

Table 2.

| Свойства стекол | Состав стекла 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| КЛТР $10^{70}$, °C$^{-1}$ | 36,0 | 39,0 | 38,5 | 37,0 |
| Температура размягчения, °C | 680 | 775 | 760 | 820 |
| Термостойкость, град °C | 255 | 232 | 225 | 220 |
| Светопропускание, %, на длине волны, нм | | | | |
| 260 | 0 | 0 | 0 | 0 |
| 280 | 3,0 | 0 | 0 | 0 |
| 300 | 19,1 | 2,0 | 0 | 0 |
| 320 | 49,4 | 19,2 | 2,0 | 0,3 |
| 340 | 72,5 | 53,0 | 53,3 | 33,5 |
| 360 | 83,5 | 77,0 | 83,0 | 73,1 |

Key: 1 Properties of glasses
2 Composition of glass
3 Coefficient of linear thermal expansion $10^{70}$, °C$^{-1}$
4 Softening point, °C
5 Thermal stability, °C
6 Light transmission, %, at wavelength, mm

## Claims

A glass that contains $SiO_2$, $B_2O_3$, $Al_2O_3$, CaO, MgO, BaO, which is distinguished by the fact that, with the goal of improving thermal stability and preventing solarization of the glass, it additionally contains at least oxide from the group: $As_2O_3$, $Sb_2O_3$, $SO_3$, $SnO_2$, $CeO_2$, in the following ratio of components, wt%:

| | |
|---|---|
| $SiO_2$ | 55-65 |
| $B_2O_3$ | 5-18 |
| $Al_2O_3$ | 10-19 |

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| | |
|---|---|
| | 1-8 |
| CaO | 0.5-4 |
| MgO | 7-15 |
| BaO | 0.1-1.5 |

and at least oxide from the group $As_2O_3$, $Sb_2O_3$, $SO_3$, $SnO_2$, $CeO_2$,

Sources of Information Considered in Examiner's Appraisal:

1. British Patent No. 962568, cl. C 1 M, 1974.
2. British Patent No. 1168270, cl. C 1 M, 1969.